Conceptual Model of Large-Scale Basin-Wide Oscillations

Paola Cessi, Scripps Institute of Oceanography

A conceptual model of the coupling between the upper-ocean wind-driven circulation and the mid-latitude atmospheric wind-stress illustrates that large-scale basin-wide oscillations with decadal period can be excited. These oceanic modes are also found in the absence of ocean-atmosphere feedback, but they are damped. The period of the oscillation and the spatial structure of the modes are essentially the same with and without coupling. These oscillations are distinct from the coupled modes of variability arising from a delayed negative feedback between the wind-driven flow and the wind-stress. They are ocean-only linear basin modes that become sustained by ocean-atmosphere coupling.